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P01/7700 0.00 - 9916095.4

The Patent Office
Cardiff Road
NEWPORT NP9 1RH

1. Your reference P79806

2. Patent Application number
(the Patent Office will fill in this part)

3. Full name, address and postcode of the or
of each Applicant (*underline all surnames*)

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Patent Office ADP Number (*if you know it*)

If the applicant is a corporate body, give
the country/state of its incorporation

United Kingdom

01693407001

4. Title of the Invention

Toy Building Blocks

5. Name of your Agent (*if you have one*)

URQUHART-DYKES & LORD

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which all correspondence should be sent
(*including the postcode*)

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Patents ADP Number (*if you know it*)

1644005

6.	If you are declaring priority from one or more earlier Patent Applications, give the country and the date of filing of the or of each of these earlier Applications and (<i>if you know it</i>) the or each	Country	Priority application No. (<i>if you know it</i>)	Date of Filing (<i>Day/month/year</i>)
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7.	If this Application is divided or otherwise derived from an earlier UK Application, give the Number and the Filing Date of the earlier Application	Number of earlier application	Date of Filing (<i>Day/month/year</i>)
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8. Is a Statement of Inventorship and of Right to
Grant of a Patent required in support of this
request ?

Yes

(Answer 'Yes' if:

- a) any Applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an Applicant, or
- c) any named Applicant is a corporate body.)

9. Enter the number of sheets for any of the following items you are filing with this

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Continuation sheet of this Form	0
Description	11
Claim(s)	0
Abstract	0
Drawing(s)	4 x 4

10. If you are also filing any of the following state how many against each item

Priority documents	0
Translations of priority documents	0
Statement of Inventorship and Right to Grant a Patent (<i>Patents Form 7/77</i>)	0
Request for Preliminary Examination (<i>Patents Form 9/77</i>)	0
Request for Substantive Examination (<i>Patents Form 10/77</i>)	0
Any other documents (<i>please specify</i>)	0

11. I/We request the grant of a Patent on the basis of this Application

Signature

Date

Urquhart - Dykes & Lord

URQUHART-DYKES & LORD

9 July 1999

12. Name and daytime telephone number of person to contact in the United Kingdom

Mr G M Davies
01792 474327

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Toy Building Blocks

5

The present invention relates to toy building blocks.
Particularly to building blocks suitable for connection to
one another.

10

The educational value of children's building block systems
is well known and a number of systems have been proposed
and/or reached commercialisation.

15

An improved building block and system has now been
devised.

20

According to a first aspect, the invention provides a toy
building block including transverse face panels
(preferably substantially perpendicular face panels)
provided with connection formation means facilitating
connection with an adjacently arranged blocks.

25

The arrangement of transverse/substantially perpendicular
face panels provided with connection formation means
facilitating connection with an adjacently arranged blocks
enables blocks to be connected side by side as well as one
upon another. This enables a highly versatile building
block system to be achieved.

30

It is preferred that the face panels provided with
connection formation means are edge connected. Desirably,

the block includes one or more further faces provided with connection formation means.

5 Desirably non-opposed face panels (and also preferably opposed face panels) are of substantially the same face area.

10 It is preferred that the building block comprises a substantially cube shaped block, preferably including four faces provided with respective connection formation means. Desirably at least one of the faces of the block is without connection formation means. Preferably two face panels of the block (most preferably opposed face panels) are without connection formation means. It is preferred
15 that one or more face panels without connection means are arranged to carry an indicia, design, character or other graphic representation. This enables for example a large 'composite' picture to be built up from an assembly of blocks, or words to be formed using connected blocks each
20 carrying a respective letter character.

It is preferred that the connection formation means of one of the faces is male and the connection formation means of another of the faces is female. Desirably opposed faces
25 of the block are provided with connection formations of opposed gender.

The cube shaped block provides the 'basic' constructional element of a children's building block system. Other
30 shaped blocks are envisaged falling within the scope of the invention including for example triangular face

panelled blocks and rectangular face panelled blocks having substantially perpendicular surfaces respective connection formation means.

5 According to a further aspect the invention therefore provides a toy building construction system or kit

comprising a plurality of building blocks according to the first aspect of the invention.

10 Desirably, the connection formation means for a respective face comprises an array of formations arranged to mate with a complementary array provided on an adjacently connecting block. The array preferably has a perimeter spaced inwardly from the edge of a respective face. The

15 array preferably comprises formations of all male projections or all female recesses. Desirably, the formations comprising the array have an axis and are most preferably substantially circular in cross section along a plane substantially parallel to the respective face.

20 Beneficially, the depth of the formations is less than the width dimension (e.g. the diameter) of the respective formation. The spacing between the formations in the array is preferably greater than the distance between the formations and their respectively closest edge of a

25 respective face. Desirably an array comprises four formations arranged in a two by two matrix.

It is preferred that the toy block is substantially hollow. Preferably the block comprises a plastics

30 material, the block comprising, preferably moulded plastics material, the connection formation means

preferably being integrally moulded with the respective face.

5 Desirably the block comprises an integrally formed shell comprising a plurality of integrally formed wall panels defining an internal void space and one or more openings into the void space, a separate end panel element (or end panel elements) preferably connects with the walled shell at the opening(s) so as to close the interior of the block.

10 Accordingly, a further aspect of the invention provides a method of manufacturing a toy building block, the method comprising:

i) forming a shell element including a plurality of integrally formed face panels defining an internal void space and an opening into the void space; and,

20 ii) securing a separate end face panel with the walled shell at the opening so as to close the interior of the block.

25 The walled shell element (and also preferably the end face panel elements) are preferably moulded in plastics.

30 The moulding preferably forms the connection formation means integrally with the respective faces.

Desirably the moulded shell element is formed having male connection formation means on a first face panel and female connection means on a second face panel. It is preferred that the moulded shell element is formed having connection formation means on opposed face panels, preferably male connection means on a first face panel and female connection means on the opposed face panel.

Desirably the shell element and the separate end face panel are provided with complementary engageable securing formations permitting the end face panel to be securely and preferably effectively permanently fixed across the opening of the shell element. Alternatively or additionally a bonding material (such as a curable bonding material) may be applied to the shell element and/or the end face panel element and/or the complementary engageable securing formations to facilitate fixing.

The complementary engaging securing formations are preferably configured such that either a push fit engagement or a snap fit engagement is provided. desirably, the complementary engaging securing formations are provided at the periphery of the face panel element and the opening of the shell element.

In a preferred embodiment the complementary engaging securing formations preferably comprise pins arranged to be received in complementary dimensioned bores in a push fit engagement. Additionally or alternatively it is preferred that the complementary engaging securing formations comprise tongue and groove like mating elements

(such as a tab receivable in a slot) extending along one or more edges of the face panel element and shell element. It is preferred that the tongue and groove like engaging formations are push fit engageable with one another.

5

In a preferred embodiment, the shell element comprises a substantially tubular element having opposed open ends, each of which is closed by a respective separate end face panel element. The tubular element preferably has four
10 face panels defining a cube shape when the separate end face panel elements are fixed in position.

The separate end face panel elements preferably include connection formation means facilitating connection with an
15 adjacently arranged blocks. It will be readily apparent, that the block and method of construction provided by the invention permit the shell element to be combined with various configurations of connection formation means (male female or none) enabling a maximum versatility for
20 manufacture using basic components. Additionally face panels of various colours may be fixed to shell elements of different colours to enhance the visual stimulatory effect.

25 The invention will now be further described in specific embodiments by way of example only and with reference to the accompanying drawings, in which:

30 Figure 1 is a perspective exploded view of a first embodiment of toy building block according to the invention;

Figure 1a is a scrap sectional view of the face panel securing engagement connection with the shell element;

5 Figure 2a is a schematic plan elevation of a toy building block according to the invention having an end panel element not in position;

10 Figure 2b is a schematic side view of the building block having end panel elements not in position;

Figure 2c is a schematic sectional view of the securing bore of the shell element;

15 Figure 3a is a schematic plan view of a first end panel element (moulded with an integral array of male studs);

Figure 3b is a schematic side view of the end panel element of Figure 3a;

20 Figure 4a is a schematic plan view of a second end panel element (moulded with an integral array of female recesses);

25 Figure 4b is a schematic side view of the end panel element of Figure 4a;

Figure 5 is a schematic part sectional view of a securing fixing pin carried by the face panel elements; and

30 Figure 6 is an exploded perspective view of an alternative embodiment of building block according to the invention.

Referring to the drawings, and initially to Figure 1, the children's toy cube building block (generally designated 1) comprises a tubular moulded plastics body 2 having integrally moulded face panels 2a, 2b, 2c, 2d defining a unitary wall around an internal void region. Face panels 2b and 2d are provided with respective two by two arrays

of block-to-block connection formations, panel 2b being provided with all-male cylindrical projection studs 3 and face panel 2d including a corresponding array of cylindrical recesses 4. The shape, dimension and spacial configuration of studs 3 and recesses 4 is such that the array of studs 3 on face 2b of first toy building block can matingly engage in releasable push fitting engagement with a complimentary array of recesses for an adjacently connected building block. Similarly, recesses 4 on face panel 2d receive an array of studs on a further adjacently connected building block.

An important feature of the invention is that, for the moulded, substantially hollow, tubular element 2, the array of male studs 3 is provided on an opposed face to the array of female recesses 4. This enables the tubular element to be moulded using relatively standard plastics injection moulding techniques.

A recessed shoulder 4 is provided around each respective open end of the tubular element 2, the recessed shoulder being enlarged at respective corner bosses 5, each of which is provided with a blind bore 6. The upper surface of the shoulders 4 are provided with respective elongate slots 11.

Separate end face panels 7, 8 of moulded plastics construction are provided with integrally moulded pins 9 shaped, dimensioned and configured to matingly engage in push fit connection with respective blind bores 6 provided in the bosses 5 of the recessed shoulder 4. The longitudinal edges of the separate face panels 7, 8 are

provided with downwardly extending integrally moulded tabs 12 shaped, dimensioned and configured to matingly engage in push fit connection with respective slots 11 provided in the recessed shoulder 4. When push fit mated into the respective bores 6 and slots 11, the pins 9 and tabs 12 ensure that the respective end face panel 7, 8 is securely (and effectively permanently) secured to the tubular element 2. As shown in figure 5, pins 9 taper outwardly from a root connecting to the panel element 7,8, to a head 15 chamfered to ease insertion into respective bores 6. The maximum diameter of the head of pin 9 is greater than the root diameter; such an outwardly tapering pin enhances the interference fit of pins 9 on bores 6.

The face panel fixing arrangement including the corner pins 9 and elongate slot and tab mating provides particularly good and effectively permanent connection between the shell element and the end face panels. The pins 9 and bores 6 ensure good connection force at the corners; the slots 11 and tabs 12 ensure good connection along the end face panel edges. The pull apart force required to separate the end panel faces from the shell element is significantly greater than the force required to separate adjacently connected blocks by disengaging a male stud array 3 from a female recess array 4.

An important feature of the invention is the flexibility of the arrangement, in that respective end face panels 7, 8 may be provided with an array of male studs 3 or female recesses 4. This enables a "core" module comprising the tubular element 2 to be connected with end panels 7, 8 as required enabling a variety of different building block

configurations and designs to be manufactured from a number of "core" elements. For example, blocks having from three male stud arrays and one female recess array to one male stud array and three female recess arrays are possible. It will also be appreciated that end elements 7, 8 could, additionally, comprise planar face elements (not including any male or female formations 3, 4). Additionally, the flexibility of the design enables end face panels 7, 8 of different colours, textures or other variables to be mated with the tubular element 2.

Referring now to Figure 6, there is shown an alternative embodiment of toy building block 101 according to the invention in which the tubular element 102 again includes respective arrays of male studs 103 and female recesses 104 provided on opposed faces.

The end face panels 107, 108 which connect with tubular element 102 (and thereby close the open ends) are provided at opposed edges with collar projections 109 which are arranged to slide over respective ramp formations 106 (provided on the internal faces of panels 102d, 102b), and snap back to a "normal" position abutting a rear shoulder of ramp 106. The abutment of collars 109 with the rear shoulders of respective ramp formations 106 substantially

-11-

inhibits disassembly of the respective end face panels
107, 108 from the tubular element 102.



FIG 1

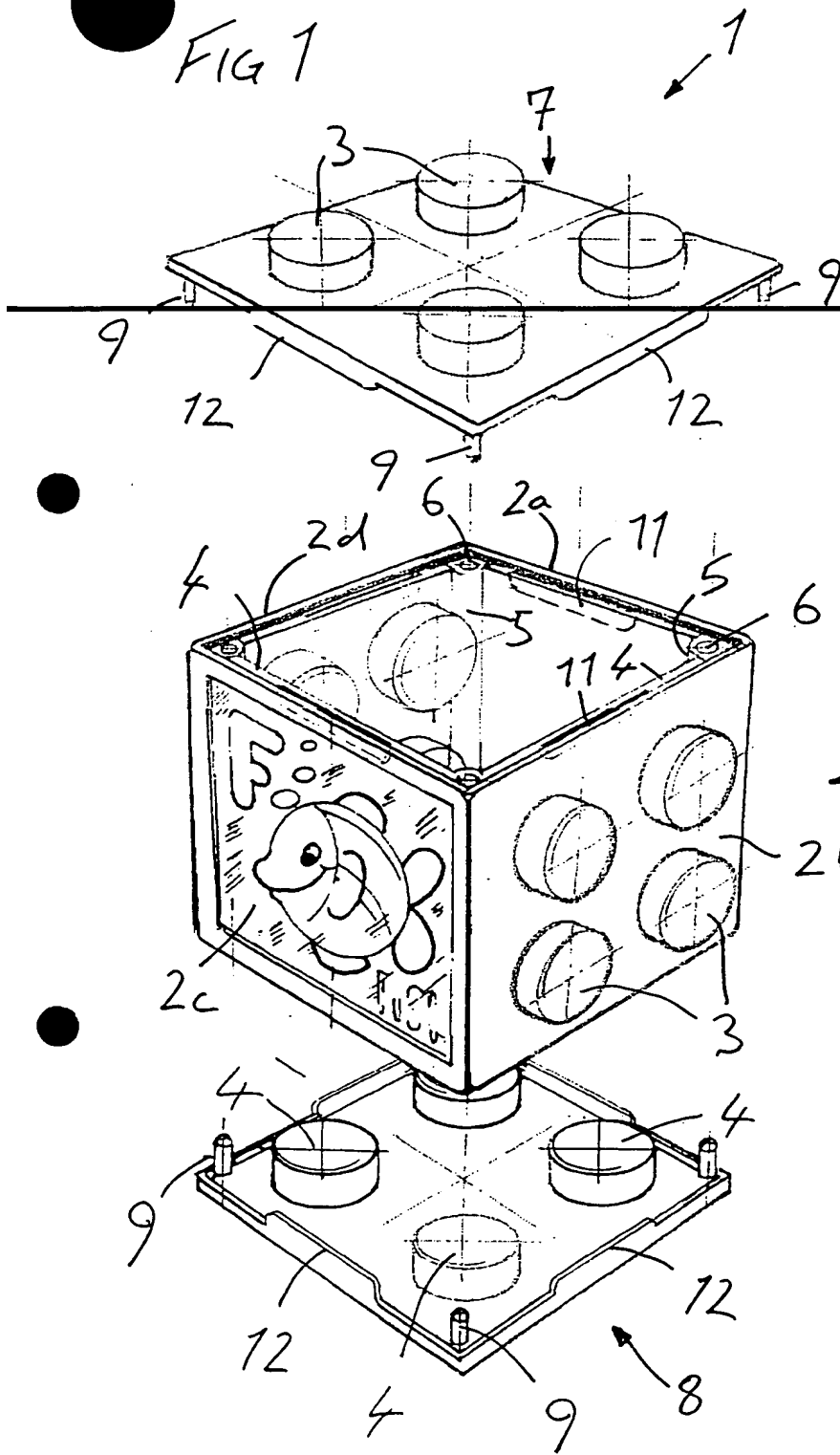


FIG 1a

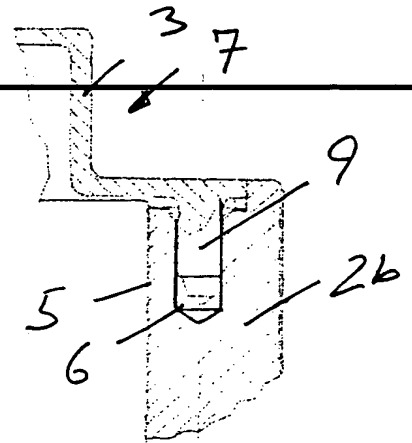




FIG 2a

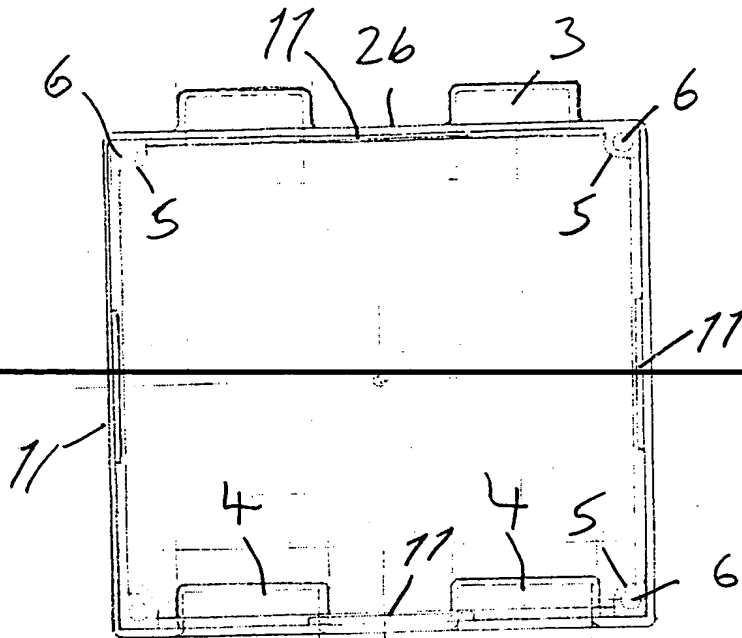


FIG 2b

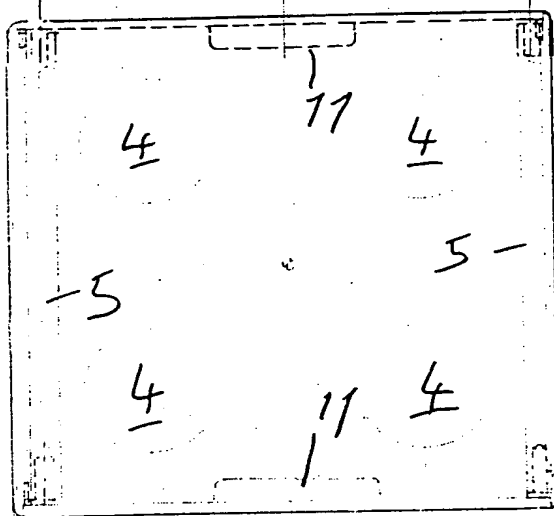


FIG 2c

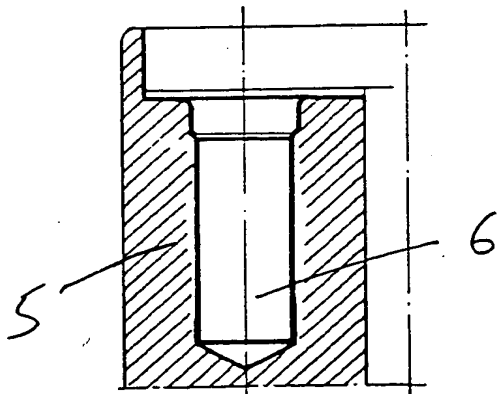




FIG 3a

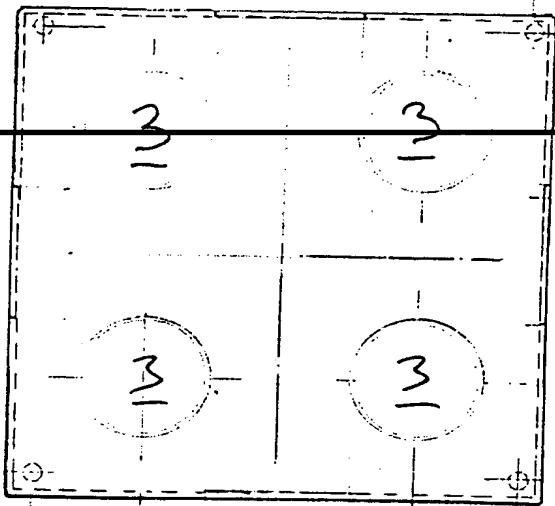


FIG 3b

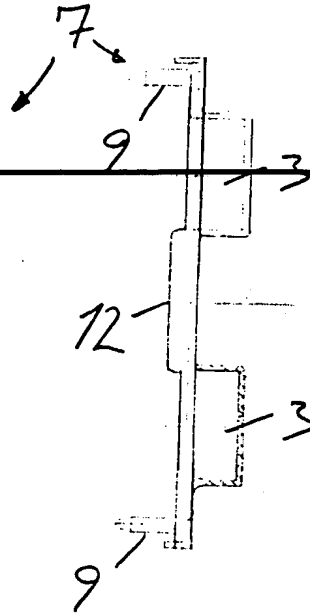


FIG 5

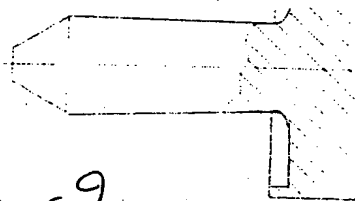


FIG 4a

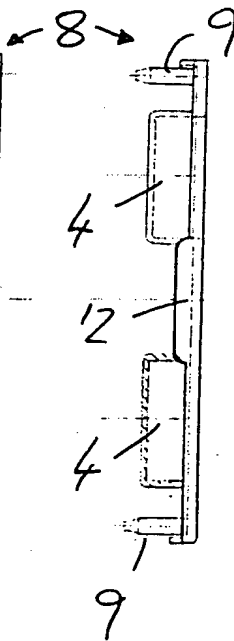
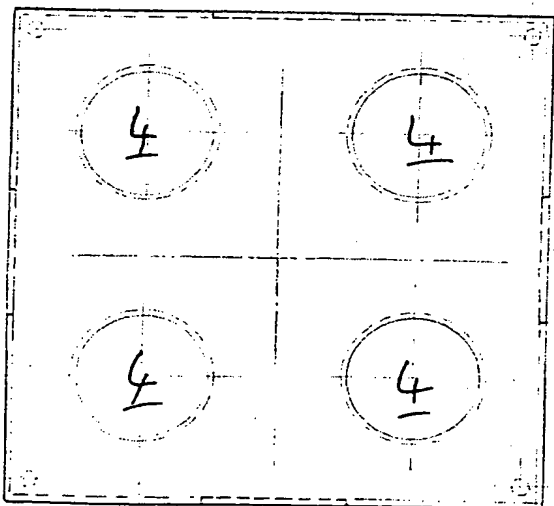
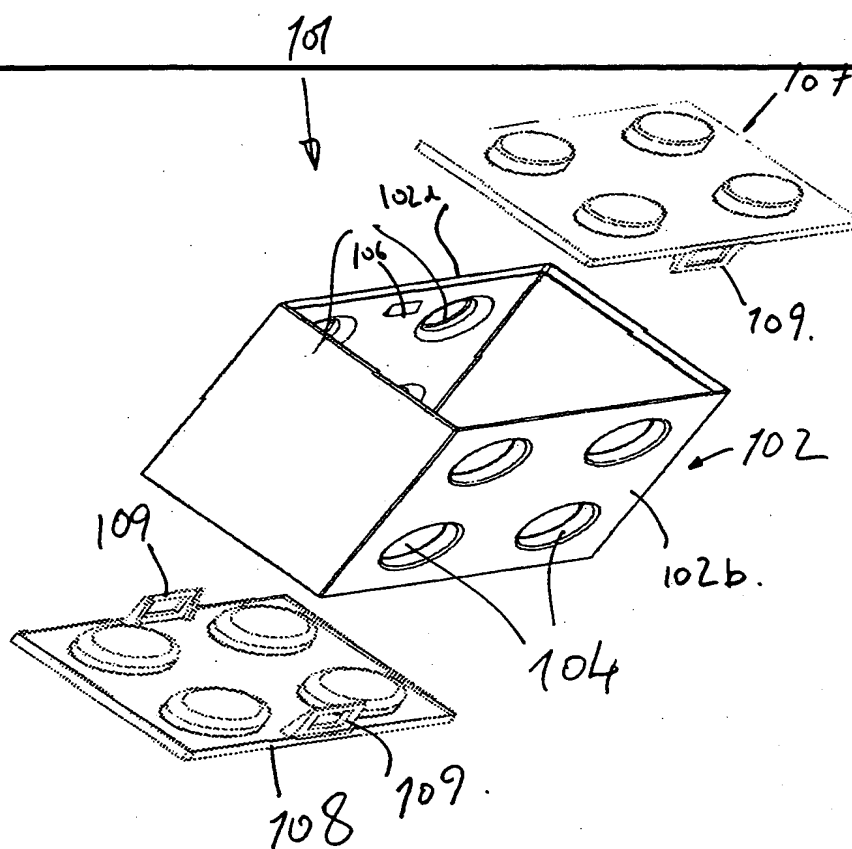


FIG 4b



This diagram shows an exploded perspective view of a multi-well container assembly. A central rectangular container (102) is shown with its lid (104) positioned above it. The container has six circular wells (102a, 102b) and a central opening (106). The lid (104) also features six circular wells (104a, 104b) and a central opening (108). Two rectangular plates (107, 109) are shown positioned around the container, each with six circular wells (107a, 107b, 109a, 109b) and a central opening (108, 109). Arrows indicate the assembly direction.



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